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## HIGH-SILICON STEEL AND METHOD OF MAKING THE SAME

## FIELD OF INVENTION

The present invention relates to a silicon steel and method of making the same. More particularly, the present invention relates to a high silicon steel and method of making the same, which belongs to the field of material making.

## BACKGROUND OF THE INVENTION

High-silicon steel, i.e. steel containing 5 to 10 wt.% silicon (Si), less than 0.01 wt.% impurities and balance Fe, has excellent magnetic properties. For example, steel containing 6.5 wt.% Si has excellent magnetic properties such as near-zero magnetostriction, low core loss and high permeability. Such high-silicon steel, however, has poor ductility, which becomes progressively worse as the amount of Si increases. This poor ductility leads to poor workability, which makes it difficult to produce high-silicon steel articles using conventional metal-working methods. The combination of poor ductility and workability makes the production of high-silicon steel sheets especially difficult.

It is known that thinner high-silicon steel sheets have better soft magnetic properties. Thus, there is a desire to produce thin steel sheets. K. Okada et al., "Basic Investigation of CVD Method for Manufacturing 6.5% Si Steel sheet" (J ISIJ 1994,80:777-784) discloses high-silicon steel sheets containing 6.5 wt.% Si that are produced by adding silicon to low-silicon (3 wt.%) steel sheets using a chemical vapor deposition (CVD) technique. This technique, referred to hereafter as "siliconizing", is both costly and inefficient. In addition to